

2001 CSO: A Revolution in the Making

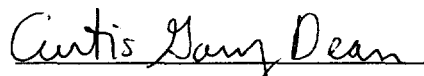
An Honors Thesis (HONRS 499)

By

Jeremy L. Lane

Thesis Advisor

Curtis Gary Dean

  
(Advisor's Signature)

Ball State University

Muncie, Indiana

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## Abstract

This analysis of the 2001 CSO is divided into 5 sections in order to grasp the full impact of this evolutionary occurrence. In the first section, the life of the actuary is described and an introduction to the 2001 CSO is made. Section II breaks down the events that lead to the development of the 2001 CSO as well as how these mortality tables were created. The third section explains the timeline and process needed for the implementation of the 2001 CSO. Section IV examines how the 2001 CSO will effect the life insurance, reinsurance, and pension actuary. Finally, the fifth section provides a conclusion with an overview of the impact of the 2001 CSO. These five sections mesh to provide a comprehensive view of the 2001 CSO and how it will impact actuaries and their companies.

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## I. Introduction

*Experience is not what happens to you; it is what you do with what happens to you.*

-Aldous Huxley

This quote illustrates how experience is a tremendous asset in our world. This is especially so in the world of the actuary. An actuary is an individual who attempts to place a value on a future risk. Whether it is calculating the expected liabilities associated with a pension fund, the potential claims of a group of insured drivers, or the life expectancy of a life insurance holder, actuarial work is at the core of assessing these potential risks. This is where experience begins to rear its head. An actuary is not a fortuneteller. These future risk predictions are not based upon conjecture or upon some mystical knowledge. Experience is at the heart of an actuary's predictions. This experience is generally compiled in a manner so that an actuary can attempt to classify the current risk and then compare it with similar risks that have occurred in the past. An actuary can't tell you exactly how long you will live, but when evaluating a large block of business, the future risks of a population tend to follow the path of similar populations of the past. From this idea, one of the primary actuarial tools is developed; the mortality table. A mortality table is a list of numbers that gives the expected number of deaths to occur in a year for a certain age. These tables are of vital importance to the life, reinsurance, and pension actuaries since their products are generally contingent upon the survival of the policyholders or pension plan participants.

Actuaries generally tend to use one mortality table as a benchmark for all work within the United States; that table is the Commissioner's Standard Ordinary Mortality Table, or the CSO

table. Recently a revised version of the CSO, titled the 2001 CSO, has been created and is in the process of becoming the official CSO table. The 2001 CSO is an evolutionary development in actuarial science. In this paper I hope to demonstrate the process associated with the development of this table, the process necessary for it to become the standard table, and the impact that the implementation of this table will have on the life insurance, reinsurance, and pension actuaries.

## II. The Evolution of the 2001 CSO

To get an idea of where modern mortality tables came from, we must look into the past. The development of mortality experience is a seemingly natural process. Over time, our culture changes, and with these changes our life expectancy adjusts nearly as much as our lifestyles. In the late 1950's, the 1958 CSO became the benchmark for mortality assumptions. At that time, the population of life insurance policyholders looked dramatically different from what you might see today. A cross section of life insurance holders in 1958 would not have the tremendous variety that today's population has. Since women rarely pursued careers at this juncture in American history, the majority of the insured population tended to be male. (3, p. 6) As a result, when the 1958 CSO Table was created, it was not separated by sex, and female mortality was predicted to be a 3-year age setback of the expected male mortality; i.e. the mortality for a female of age  $x$  was assumed to be the same as a male of age  $x-3$ . (3, p.6)

Over the next 20 years, America experienced a tremendous amount of change. With women moving into the workforce in large numbers and a need for more precise mortality assumptions, the SOA began the development of the 1980 CSO. With all of the changes occurring in America at the time, many problems became apparent with the 1958 CSO Table. Some of the changes that had the most profound impact were the following:

- More women entering the workforce
- Improved mortality
- Dramatic reserving problems

It became clear that it was time for a change. The 1980 CSO Table was based around mortality experience from 1970 to 1975. (3, p. 6) This study utilized data from medically tested and non-

medically tested individuals together to create the basis for the 1980 CSO Table. (3, p. 10) This table also is broken down between males and females, a first for a CSO table. The 1980 CSO was a revolutionary development. Many of the ideas that are at the heart of the 2001 CSO came about through the development of the 1980 CSO Table. Smoker versus non-smoker, the mortality dip around age 25, the removal of war deaths from mortality, the development of selection factors for reserving purposes, and the creation of male and female basic tables are all at the heart of current mortality assumptions and the 2001 CSO.

#### A. Changes to the industry that necessitated the creation of the 2001 CSO

When looking at creating an entirely new set of mortality tables, one might ask why the Society of Actuaries (SOA) felt all of this work was necessary. Therefore, we must look at the societal changes that have necessitated an update to the basic mortality assumptions used by actuaries. Three primary motives exist for the creation of the 2001 CSO:

- (i) Changes in mortality assumptions
- (ii) Adjustments for the impact of AIDS
- (iii) Considerations of preferred risks

These underlying forces have shown actuaries that it is time to re-evaluate the basic mortality assumptions conveyed in the 1980 CSO.

One of the primary adjustments needed was an adjustment for improved mortality. Since the 1980 CSO table's primary assumptions were created using information from the 1970's, an update accounting for our society's overall level of health was clearly needed. (7, p. 19) Several factors contribute to improvements in the overall health of the average American. Improved



health care technology, medical procedure developments, improved pharmaceutical performance, greater availability of health insurance, and improvements in long-term care all have had a dramatic impact on the life expectancy of someone living in the United States. Since it would be nearly impossible to break out the improvements associated with every one of these changes in our society, the SOA Individual Life Insurance Mortality Research Task Force had to find a new method to track these changes. The task force felt that instead of trying to single out information relating to each change, it could accurately assess these changes as a whole by looking at mortality changes in the entire population. This is possible because none of these changes are isolated, “shock” events, instead, they are gradual improvements or decreases that will provide a lasting impact on the overall health of the average American. The data used for this evaluation was the 1990-1995 Basic Mortality Tables. (7, p. 19) The experience of this table has a central year of 1992; therefore it became necessary to adjust the experience forward to compensate for mortality improvements from this date. By using the tremendous amount of data available to the SOA from the companies that support it, this process seems to be a very logical and well thought out method for considering the many changes that have affected American mortality.

One change since the 1980 CSO that can be broken out easily and is deserving of such recognition is the impact of the AIDS virus on America. In 1980, AIDS was not a prevalent part of American culture. However, in the late 1980's and the early 90's, the virus spread at a tremendous rate and claimed the lives of many Americans. The primary mode of acquiring the AIDS virus during this time was through promiscuous, unprotected homosexual activity. Thus, the primary group affected was males age 20 through 30. Since the central year for the 1990-1995 Basic Mortality Tables was 1992, AIDS definitely had a dramatic impact on this group. In

fact, mortality rates were around 100% higher than they were in the same age group of the 1970-1975 Basic Mortality Tables. (7, p. 6) This spike can be attributed to the impact of AIDS. The timing of this study coincided with the peak of the AIDS epidemic, and although it is not gone by any means, it has decreased since then. This decrease can be attributed to improved medical treatments, increased awareness, and better detection of the presence of the AIDS virus. Therefore, the task force felt that these 100% changes overstated the impact of AIDS on American culture today. As a result, this change was decreased to around an 85% increase to reflect the status of the current environment. (7, p. 6)

Another change in the life insurance market that needed to be addressed was the creation of preferred classes. A preferred class can be best defined as segmentation of an insurer's policies intended to benefit those with lower than average expected mortality. These segmentations are based upon certain medical and non-medical criteria that tend to either shorten or lengthen an insured's life expectancy. (7, p. 24) Preferred classes have become very popular, and the reason for this is because the information needed to create preferred classes is readily available with today's technology. Health characteristics like blood pressure, cholesterol level, physical activity level, and several others all play a role in which risk class an individual is placed when they take out a life insurance policy. (7, p. 24) As a result, mortality assumptions are decreased to compensate for either positive health characteristics or increased to account for negative health characteristics. Since this trend is so prevalent, the Task Force felt that it was necessary to attempt to evaluate these classifications as well when evaluating the information used in the study. One problem that the Task Force encountered when dealing with preferred classes is that no standard set of classifications exists in the industry. One company's definition of "preferred" or "super preferred" may vary greatly from another company's. Another problem

with evaluating preferred risks is that the amount of mortality adjustment per risk class is not standard throughout all insurance companies. (7, p.25) These dilemmas made it very difficult for the committee to create tables by risk class. As a result, the Task Force decided not to create separate mortality tables for preferred risks. (7, p.25)

#### B. How the 2001 CSO was developed

The creation of the 2001 CSO began in July 1999 with the creation of the SOA Individual Life Insurance Mortality Research Task Force. The purpose of this task force was to create the 2001 Valuation Basic Table (VBT) that will eventually be used to create the new valuation mortality table known as the 2001 CSO. (7, p. 1) The primary source of experience used for the development of the 2001 CSO was the SOA's 1990-1995 experience study. (7, p. 1) This is very similar to the way that the 1970-1975 experience was utilized to develop the 1980 CSO Tables. The 1990-1995 experience tables are based off of individually underwritten policies that fall in the stated time frame. This experience provided a strong base for the creation of the 2001 CSO as it is composed of a great deal of varied experience that provides a general picture of American mortality expectations in the early 1990's. The study did not include information that came from policies that had little or no underwriting guidelines or policies that were classified as "substandard". This creates an upwardly biased table that is generally well accepted because the majority of life insurance policyholders tend to be wealthier and consequently have a higher level of health.

The next step would be to take the information from the 1990-1995 experience study and date it forward to 2001 in order to develop the 2001 Valuation Basic Tables. In order to

successfully accomplish this daunting task, the committee would need to overcome several obstacles including taking into account smoker versus non-smoker information, adjustments for minimal experience for older and younger ages, and adjust the overall smoothness of the completed tables. (7, p. 8)

When the SOA used smoker versus nonsmoker experience as an evaluation tool in the 1990-1995 experience study, this was the first time that this information was examined in a basic mortality table. (7, p. 8) Directly attributing mortality changes to smoking is not an exact measure, so the SOA proceeded with extreme caution in order not to attribute too dramatic of a mortality change to smoking status. As a result, the SOA felt it necessary to supplement it with data from other areas in order to verify its validity. With the countless forces of mortality acting upon all of us, it was simply impossible to break out one that is as inexact as smoking and evaluate its impact beyond a doubt. The SOA turned to several clinical studies and found many discrepancies that needed to be addressed. (7, p. 6) Age, gender, quantity smoked, how to classify ex-smokers, and the definition of “smoker” all posed problems for the SOA. However, the SOA was able to utilize the information from their experience study in coordination with general population references from Pechmann and the US Surgeon General. (7, p. 6) From here, the SOA Task Force was able to develop a trend line that would be used to account for smoker versus non-smoker status.

The next issue that required the attention of the SOA Task Force was the problem surrounding higher and lower ages in the 1990-1995 experience study. Since life insurance is not sold widely to individuals under age 18 and over age 75, the information used in the 1990-1995 experience study in these areas seemed to be uncertain. As a result, the SOA Task Force again looked to outside sources to supplement their current information. The two primary

resources used for the older age mortality assumptions were a study by Bragg and Associates and the VA 93 Permanent plan mortality experience. (7, p. 6) The study by Bragg and Associates provided \$132.4 billion of male exposures over age 65 and \$46.1 billion dollars of female exposures. (7, p. 6) This information was also already divided up into three categories: smoker, non-smoker, and smoking status unknown. The VA 93 Permanent Plan mortality experience came from a particular program that provided life insurance to World War II veterans and was the primary tool in conducting this study. The study was very helpful because it provided a tremendous amount of data for higher ages, in particular from ages 58 through 95. (7, p. 6) As far as the younger ages go, the primary concern was justification for the observed increase in mortality around age 16. The SOA Task Force felt that this jump in mortality could be attributed to the influx of new drivers into the population. (7, p. 7) As these drivers become more experienced around age 25, the mortality assumptions return to a more predictable pattern.

One of the final adjustments needed was to create smoothness in the table. When creating a table of this sort, a flow is desired from the data. The mortality of one year should be similar to the previous and the following years with only slight variation in a predictable and explainable manner. When relying upon experience alone, this is not always the case. As a result, the SOA Task Force felt it necessary to make these very slight adjustments to create a stronger, more reasonable mathematical model. Generally, mortality is expected to increase with age. In the case that this increase was not evident, adjustments were made. The task force used log-linear interpolations and slight magnitude changes ranging from .00001 to .00005 to create the look and feel that they felt the mortality assumptions should represent. (7, p. 8) These changes are perhaps the most subjective work done by the SOA Task Force. Since the

individuals that compose this group have so many resources at their disposal as well as a wealth of industry experience, it seems as though those assumptions and adjustments are sound.

#### C. How the 2001 CSO has been tailored to a dynamic industry

In the world of the actuary, whether it be pension, life insurance or reinsurance, adjusting to change and being able to provide a customer with exactly what they are looking for is becoming more and more important. In the past, an actuary could provide a product that is profitable and simple and probably play an integral role in their company's success. However, in today's marketplace, competition is the name of the game. With this competition comes a requirement for the actuary to attempt to provide each customer with a unique solution to their given dilemma. Whether it be creating an effective pension plan for a small employer, developing a life product to target a specific demographic, or customizing a reinsurance network for a large insurer, the actuary must be able to work quickly and efficiently to meet the customers' needs. This is where the 2001 CSO will be a tremendous asset. With the development of more and more classifications from smoker versus non-smoker to various preferred classes, the actuary will be able to develop a broader range of mortality assumptions necessary to drive their work. By providing different ultimate and select tables as well as smoker versus non-smoker tables, the 2001 CSO has made the puzzle associated with valuation, reserving, and pricing a little bit easier to put together. Mortality Tables are a constantly developing tool for the actuary, and hopefully by establishing a standard for some of the common procedures of the actuary we will be able to become even more customer friendly.

#### D. The completed 2001 CSO

The 2001 CSO does have some dramatic changes over its predecessor, the 1980 CSO. One example is the gap between male and female mortality. Women have always tended to outlive men. There has been much conjecture as to why this is so, but it is commonly tied back to the fact that men are more commonly prone to heart attack and several other diseases often linked to stress. (4, p. 2) However, with more women entering the work force and their stress levels subsequently increasing, the gap between male and female mortality is narrowing. Male life expectancy is increasing at a rate greater than that of female mortality, a trend that will probably level off as the two become closer. This change can be clearly seen in the table on the following page as gaps between key ages have dwindled.

Another development unique to the 2001 CSO is that the slope of the mortality is less than the slope of the 1980 CSO. (4, p. 2) This indicates that mortality in our population does not increase as rapidly with age as it did in the past. This flatter slope may be partially attributed to the increase in mortality for ages 25-49 from AIDS deaths. Through the increase in mortality in an age bracket that previously represented the lowest mortality in our culture, the levels of other age groups have consequently become closer and the overall slope of the table decreased. This adjustment only partially explains the decreases in slope. Increased life expectancy and lesser mortality at higher ages have lower mortality levels at the tail end of the 2001 CSO. By doing this, we get the same effect that an increase in mortality in the middle age brackets created, a smaller slope.

Perhaps the most significant change the 2001 CSO presents over the 1980 CSO is the creation of separate rates for ultimate and select risks. (4, p. 2) The 1980 CSO was an ultimate

table and select factors were published separately that could be applied to determine the necessary rates. However, due to an increase in available experience regarding ultimate versus select mortality rates, the task force was able to create select, ultimate, and composite tables for both males and females. This development will prove extremely useful to the actuary as it provides a clear benchmark for the mortality of these specific risks.

<b>Female Life Expectancies</b>				
<b>At Age</b>	<b>0</b>	<b>25</b>	<b>50</b>	<b>75</b>
<b>1980 CSO</b>	77.13	53.66	30.19	11.08
<b>2001 CSO</b>	81.84	57.28	33.33	13.18
<b>Male Life Expectancies</b>				
<b>At Age</b>	<b>0</b>	<b>25</b>	<b>50</b>	<b>75</b>
<b>1980 CSO</b>	69.62	46.87	24.50	8.40
<b>2001 CSO</b>	77.43	53.21	29.64	10.23



### III. Implementation of the 2001 CSO

The implementation of the 2001 CSO creates a unique opportunity for corporations and government regulators alike. While companies prepare for the changes that this development will bring, state regulators will begin to evaluate the validity of the 2001 CSO and begin the process of making it the standard mortality table. When looking at a change of the magnitude of the 2001 CSO, an important aspect to consider is what sort of adjustments will need to be undertaken to make this tremendous transition. Actuaries will be faced with a variety of tasks when adjusting to the 2001 CSO. How well actuaries adjust to these changes may play a large role in determining their company's success within their particular market.

#### A. How the 2001 CSO has been embraced by corporations

A transition of this magnitude requires tremendous preparation as well as a large amount of knowledge. Companies realize this need for knowledge and preparedness as they try to remain profitable in this changing environment. As a result, many employers are trying to educate portions of their actuarial departments in exactly what the 2001 CSO will be and how it will affect their current way of doing business. State governments are also trying to cope with this. In interviews with several actuaries, I have heard many of them refer to either themselves or someone in their department attending conferences to discuss the implementation of the 2001 CSO. The conferences or meetings are often sponsored by the Society of Actuaries or by smaller, local actuarial groups. This active role by the SOA is crucial in carrying off a smooth transition between the 1980 CSO and the 2001 CSO. The 2001 CSO was created by a Task

Force that is composed of many practicing actuaries who serve their respective companies in a variety of ways. (1, p. 1) By relying on these individuals to educate their co-workers as well as using them as speakers at the conferences created to educate about the 2001 CSO, companies have some tremendous resources available to prepare them for this change.

Time is also a great help to companies attempting to adjust to the 2001 CSO. The 2001 CSO tables are already widely available, which allows actuaries to evaluate them and determine exactly how dramatically these changes will affect the work that they perform. Regulatory approval of the 2001 CSO by the individual states will not be an overnight process. As a result, companies will have a decent amount of time, probably several years, to attempt to finalize all of the adjustments necessary for this changeover. With all of this time, companies should be able to methodically review all of their systems and policies and be able to pinpoint exactly what adjustments will be necessary.

#### B. The process for making the 2001 CSO the standard mortality table

As mentioned above, companies will have several years to prepare for the mandatory switch to the 2001 CSO. The primary reason for this gap is because of the need for state approval of the 2001 CSO as the official table. Life insurance and reinsurance are all state regulated. Regulations vary from state to state and can often cause problems for companies trying to cope with these differences. Similarly, the mandatory implementation of the 2001 CSO will occur on a state-by-state basis. Each state has a state insurance commissioner who will have to follow whatever process is necessary to make the 2001 CSO the standard table. Ultimately, the commissioner has the final say in when the 2001 CSO will be adopted. (4, p. 3) Most states

have a comment period where companies try out the table and suggest any adjustments they see fit. The length of this sort of trial period is dependent upon how many problems arise and how long it takes for the commissioner to deem the new table adequate. The key number in this implementation process is 26. (4, p. 3) Once 26 states have adopted the 2001 CSO, it will become the prevailing table and all companies, whether in a state that adopted or not, must convert to it for tax and reserve purposes within three years. Many actuaries hypothesize that this number will be reached in either 2003 or 2004, but this is purely conjecture.

## IV. Impact of the 2001 CSO

One area of change associated with the 2001 CSO that we have not evaluated is the impact that this dramatic development will have on actuaries and the work that they perform. Adjustment to changes in the market is critical to any business, especially when the change has a profound impact on the entire market. If a company can not only cope with changes, but turn them into an advantage, then it can often earn the competitive edge necessary to claim a new portion of the desired market. When evaluating changes in the life of the actuary, it is critical to look at how the changes affect specific types of actuaries. Two groups of actuaries will feel the greatest impact related to the implementation of the 2001 CSO and they are life insurance actuaries and reinsurance actuaries. These actuaries will face tremendous challenges in the next few years adjusting to shifts in long-standing mortality assumptions. Pension actuaries also face the challenges of mortality adjustments, however, they are farther along in the process. By analyzing how pension actuaries have responded to this change, we can get an idea of what life insurance and reinsurance actuaries must do in order to make a successful transition. Through personal interviews with actuaries in each of these respective fields, I have been able to get a glimpse at exactly what some of these issues are and how companies are preparing for them.

### A. How the life insurance actuary will handle the 2001 CSO

Life insurance, by nature, will face perhaps the largest fundamental changes. When determining a life insurance premium, two key elements are weighed; mortality expectations and various forms of loading. Obviously, mortality assumptions will be adjusted. Many companies

use the 1980 CSO as a starting point for their mortality assumptions. They may have many classes of clients and move from this benchmark depending upon what underwriting guidelines the particular risk falls under. Companies may also aim their products for certain types of clientele. Companies with a long history of sales to affluent customers where their experience differs from standard mortality assumptions may only make minor adjustments. On the other hand, a company with a more general product that is aimed at a standard market may take these changes very seriously and need to revolutionize their products to remain competitive and profitable. Generally, the assumptions underlying life insurance products are initially based off of mortality tables, but often tailored according to a company's unique experience. Thus, the adjustments in the price of life insurance due to mortality changes should be minimal.

Loading factors for life insurance cover a variety of expenses. Claims processing, taxes, profit margins, and other administrative expenses all fall under the heading of loading. One of these areas, taxes, may cause a tremendous amount of change. Since life insurance benefits are paid tax-free and a tax is not directly applied to a premium payment, the government's money must be withdrawn somewhere. This is where loading fees enter into the equation. An insurance company pays a substantial amount to the government in order to keep life insurance benefits tax-free and this money comes from loading expenses in the premiums. In an interview with Curtis Clingerman of American United Life Insurance in Indianapolis, I learned a great deal about the obstacles that life insurers need to overcome dealing with taxes. Mr. Clingerman told me that due to the complex structure of reserving and changes to what percentage of a premium will be directly invested, taxes paid by life insurers are expected to increase substantially. (2) Mr. Clingerman went on to state that these increases would not be simply absorbed by the life insurer, but passed on to the consumer through increased loading expenses. When I asked what

American United Life was trying to do in order to curb the impact that these cost increases will have, Mr. Clingerman said that they were trying to get “creative.” New products, different investment strategies, and various tax havens are all options that his company is exploring. In addition, American United Life is trying to educate their sales force so they can begin to prepare potential customers for the changes that are about to sweep over the life insurance landscape. When evaluating this approach, it seems that American United Life has a very solid plan.

In another discussion with Bruce Williams of Gen American Life in St, Louis, I learned that they haven’t started to consider the ramifications of the 2001 CSO. (8) By having a plan and a list of possible alternatives accompanying their well-informed sales force, it seems that American United Life is poised to make a smooth transition into the 2001 CSO. By doing so, American United Life will be able to provide their customers with a stable product that is devoid of unwanted surprises. American United Life has apparently taken full advantage of all of the information available pertaining to the 2001 CSO and by doing so has been able to predict some of the changes that will affect their niche in the life insurance market.

The challenges that lie ahead of American United Life are not uncommon throughout the life insurance industry. “Creative” solutions will be at a premium, as rising costs will need to be curtailed in order to maintain sales volumes and profitability. If companies can take the initiative and begin to prepare not only themselves, but also their customers, then the transition should be smooth and the life insurance market should emerge unscathed.

## B. How the reinsurance actuary will handle the 2001 CSO

The role of the reinsurance actuary is an ever-changing one. Reinsurance actuaries work with life insurance companies in order to help alleviate some of the risk associated with their particular book of business. By providing services such as mortality expertise, product development assistance, and large amounts of capital, a reinsurer can be a tremendous asset in helping an insurer to grow at a regular, profitable rate. The actuaries of the reinsurance world serve in various capacities. Pricing and valuation are two of the key areas, as these actuaries determine the premium needed to take over the risk of a potential client and then verify that the proper reserving is taking place. Product development is another key area as these actuaries work in an almost consulting relationship with the insurer to develop better products that will profitably fit the insurer's target market. Underlying all reinsurance is research and development. One of the key elements that makes reinsurance a desirable commodity is mortality expertise. By collecting as much information as is possible and combining it into a meaningful compilation of actuarial work, research and development actuaries are critical in developing the mortality expertise insurers so badly seek.

In all of the facets of actuarial reinsurance work, mortality plays a critical role. Whether it be suggesting a different mortality structure to a client or creating new assumptions to be used in reserve calculations, mortality is always present. When trying to figure out how the implementation of the 2001 CSO would impact the reinsurance actuary, I contacted JJ Lane-Carroll of Swiss Re. Swiss Re is one of the world's largest reinsurers on both the property and casualty side as well as on the life and health side. Mrs. Lane-Carroll is a member of the pricing department at Swiss Re where she manages several of the larger accounts for Swiss Re Life and

Health North America. Swiss Re recently acquired Lincoln Re in a multi-billion dollar deal to make it the largest life reinsurer in the U.S. market. With the vast number of clients that Swiss Re services, the amount of knowledge and mortality expertise that has developed there is profound. Mrs. Lane-Carroll emphasized that the majority of the mortality expertise passed on to the clients is not based directly off of mortality tables, but more so off of experience and research about particular populations. (5) However, Mrs. Lane-Carroll did say that these tremendous adjustments will need to be undertaken by actuaries throughout the business. These changes are rooted in changes to requirements for statutory reserves. States require companies to hold a percentage of their at-risk policies in cash, this is known as their reserves. The amount of funds must be held or reinsurers and insurers face insolvency. These amounts are determined by the states and ultimately by the underlying mortality tables used by the states. By changing to the 2001 CSO, a decrease in overall mortality will occur. According to Mrs. Lane-Carroll, this mortality shift will result in reserves being cut by 20-60%. (5) This is a benefit to the reinsurer because it allows them more capital to invest and earn a higher rate of return. However, some drawbacks do exist. Since this money is not being used in a reserve capacity, it is taxable. This increase in tax may offset any increase in capital gains that result from the decreased reserve amounts. (5) Mrs. Lane-Carroll felt that the management of this change creates opportunities for the reinsurer. Through proper management, she feels that a net gain is possible. This is where planning comes into play. Managing the complex tax laws of the reinsurance industry will be a necessity as tax amounts could spiral out of control if left unchecked. However, if monitored carefully and prudent investment decisions are made, a profit could be possible.

Profit by a reinsurer is always a good sign for their customers, the life insurers. If a reinsurance company is able to create an additional profit margin, this will result in a decrease in



premiums for the life insurer, and ultimately, the life insurance policyholder. If some companies are able to offer their services at a reduced cost, they could potentially expand their market share and begin developing new client relationships.

### C. How the pension actuary will handle the 2001 CSO

The role filled by a pension actuary is very different than those performed by life insurance or life reinsurance actuaries. Life insurance and reinsurance actuaries generally have defined products that they are selling to their clients, whereas, a pension actuary is marketing a completely different commodity. The pension actuary sells advice. Pension actuaries generally work for consulting firms where they provide expertise to companies about how to properly fund and manage their pension plans. For this reason, the career of a pension actuary is very fast-paced and changing. A pension actuary may be responsible for helping structure a plan for a 50 employee client one minute and be working on a valuation for a Fortune 500 company the next. Since these actuaries work directly for clients, the market for providing their services is very competitive. As a result, deadlines are created and must be strictly adhered to in order to maintain strong client ties. And since these actuaries are paid by billable hours to the client, workloads can often times be heavy and hectic. This fast-paced environment is ideal for many individuals, as actuaries have thrived throughout the years in the pension field.

Mortality is a vital component to properly analyzing the potential costs associated with a pension plan. Defined benefit plans are particularly dependent upon mortality since they pay a set amount to the beneficiary until their death, or sometimes until their spouse's death. Pension actuaries must also consider the possibility of death of a pension plan participant prior to

retirement. This occurrence can also have an impact on the funding needs of the plan and upon what sort of benefits the employer feels comfortable providing.

When trying to determine where to direct my questions regarding the 2001 CSO and pension actuarial work, I looked first to the industry leader. Towers Perrin is a global consultant that specializes primarily in pension work. With offices in cities throughout the United States, Towers Perrin recognizes itself as one of the largest actuarial employers in the U.S. I contacted Pete Smith of the Towers Perrin office in Cleveland to begin my search for information. Mr. Smith is a Senior Consultant and manages the accounts of around 8 to 10 clients. Mr. Smith never has a “typical” day as his duties vary greatly. It is not uncommon for Mr. Smith to be working on a valuation for one client while trying to develop a plan strategy for another and in his spare time, trying to manage some of the younger members of his team.

When I first addressed the topic of the 2001 CSO to Mr. Smith, I learned a very interesting fact. Since pension plans are held to federal standards as opposed to state regulations, different mortality assumptions are created. The 2001 CSO has very few applications for the pension actuary. However, I was able to gain some very important information. Recently, the IRS proposed a new mortality standard as well, the RP 2000. The RP 2000 is very similar to the 2001 CSO, however its target is more toward the upper age ranges since these are the ages that pension plans deal with. The RP 2000 was also created by the SOA and I felt that by analyzing how it has impacted the pension world, we might see what effect the 2001 CSO will have on the life insurance and reinsurance worlds.

Mr. Smith said that it is critical to keep clients updated on the changes that will occur because of the change in mortality standards. (6) Through his years of experience dealing with clients, Mr. Smith said that much like any change, if an employer is given time to prepare for it,

they generally understand and can make the proper adjustments. This is similar to what is happening in the reinsurance industry, as clients look for solutions to the changes that will occur in the near future. Mr. Smith also said that as far as technology was concerned, the updates and changes should be quite easy to make. In fact, he said that his software updates were finished in minutes. (6)

When asked how this change has affected his clients, Mr. Smith stated that the impact depends on how well prepared a company is and how large their plan is. If a company has a well-funded pension plan and has created it so that it can survive the rigors of a changing economy and culture, then few problems are anticipated. However, if a company has limited resources and doesn't wisely allocate them, problems are bound to occur. The largest client that Mr. Smith services has planned for a 1 to 3 percent increase in their liabilities. This increase equates into \$30 to \$90 million over 5 years. (6) This number may seem staggering, but the size of the plan is quite large.

Mr. Smith's best advice to other companies preparing for a mortality change is to try and analyze the impact from every possible view. The demographics of a company have a tremendous amount of impact upon how much mortality changes will effect financial projections. If a company's target market has relatively stable mortality assumptions, than the effects should be minimal. Mr. Smith also suggested taking these changes and looking at how they fit into the big picture. If a company is forecasting a 1% to 3% disruption from mortality changes, but is facing a 0% return on market investments instead of the 9% they anticipated, then the mortality changes will take a back seat. In this industry, trying to tackle the largest problem is critical because companies cannot generally afford to fund elaborate plans for every change

that occurs along the road. By creating conservative contribution plans and sound investment strategies, many pension plans can absorb these relatively small changes.

## V. Conclusion

The 2001 CSO is a revolutionary step in the development of mortality assumptions relied upon by actuaries. Throughout its methodical creation, societal influences were carefully weighed to construct the most accurate predictions about the general level of mortality in the United States. By further developing smoker-versus-non-smoker standards, weighing the impact of AIDS, and adjusting for improved medical treatment techniques, the 2001 CSO provides an up-to-date and useable mortality standard for actuaries.

The implementation of the 2001 CSO will be a long-term project as state commissioners test the strength of the SOA's most recent mortality standards. By thoroughly testing the tables in the market place, companies should be able to get a feel for what the onset of the tables will bring. These testing periods should allow companies to become further educated about the background of the 2001 CSO as well as how it will impact their operations and ultimately their products. Overall, the implementation process is organized and easily executable.

Industry adaptation to the 2001 CSO is being met with varying degrees of success. Pension actuaries have shown the right and wrong steps to take as far as making adjustments to mortality changes. Adaptable software and client education have been critical elements in their successful transition. As life insurance companies and reinsurers prepare for the 2001 CSO, these same concepts will be important. Coping with tax differences and lowered reserve levels will be some of the obstacles ahead of these actuaries. Education about the 2001 CSO and evaluating all possible alternatives are critical aspects in determining how well life and reinsurance actuaries will respond to this change. Whether or not actuaries take advantage of

these adjustments will play a role in determining the success of their products and ultimately, of their companies.

Change is an inevitable part of the world around us. The business world typifies this as the ability to adapt quickly and accurately is critical in the midst of the ever-changing face of our economy. Actuaries are not exempt to this rule. As more and more information becomes readily available at our fingertips, developments of the future must replace the antiquated methods of the past. With the vast amount of knowledge and experience available to the Society of Actuaries Individual Life Insurance Mortality Research Task Force, this has been accomplished. And like Aldous Huxley said, the experience that actuaries and their companies have will not be dependent upon the new mortality tables themselves, but ultimately upon what they do with the opportunities created by the 2001 CSO.

## VI. Bibliography

- (1) Albert, Faye, et. al. *Draft Report of the American Academy of Actuaries' Commissioners Standard Ordinary Task Force.* 1-32.
- (2) Clingerman, Curtis. Personal interview. 22 February 2002.
- (3) Education and Examination Committee. *Ordinary Life Insurance Mortality and Persistency.* 1-30.
- (4) Lane-Carroll, JJ. "New CSO Table Makes its Debut." *Reinsurance Reporter.* November 2001. 1-5.
- (5) Lane-Carroll, JJ. Personal Interview. 25 January 2002.
- (6) Smith, Pete. Personal Interview. 19 March 2002.
- (7) Society of Actuaries. *Report of the Individual Life Insurance Valuation Mortality Task Force.* November 2001. 1-27.
- (8) Williams, Bruce. Personal Interview. 18 February 2002